28 Shuttle bus service schedule
16 points

Introduction

You just started a new job in the customer services department for a hotel in the exotic island of Koh Tao and your first assignment is to plan the shuttle bus service between the airport and the hotel.

Each day you will be given a list of guest families with their arrival time and the number of family members. The hotel management will indicate how many bus trips you can arrange for the day. Fortunately, buses are so big that each of them has enough capacity to carry all the guests in one go if needed.

Your job is to schedule the bus departures to minimize the hosts' waiting time and report the best possible total time.

Input format:
[Number of bus trips, not more than 10]
[Number of guest families, not more than 10]
[Arrival time] [Number of family members]

Output format:
Total waiting time: [waiting time in minutes] minutes

Input

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2
3
5:00 5
10:00 2
20:00 1
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Output

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Total waiting time: 1200 minutes
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In this example, we have 3 families arriving to the island at 5:00, 10:00 and 20:00 but we are only allowed to schedule 2 bus departures.

The best solution consists in scheduling the first departure at 5:00 and the second one at 20:00. By doing so, the 1st and the 3rd family won't have to wait at all, and the 2 members of the 2nd family will have to wait 10 hours each for a total of 20h waiting hours (10h*2p=1200 minutes).

Any other schedule using 2 buses would increase the total waiting time per person. For example, if we had scheduled the buses at 10:00 and 20:00, the total waiting time would have been 25h (5h*5p=1500 minutes), which is worse than the 20 hours obtained with the best possible schedule.